1. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{10x^3 - 59x^2 + 61x + 60}{-10x^3 + 3x^2 - 27x - 36}$$

A. Horizontal Asymptote of $y = 0$

B. Vertical Asymptote of $y = 1.500$

C. None of the above

D. Horizontal Asymptote of $y = -1.000$

E. Vertical Asymptote of $y = 4$

2. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 - 50x^2 + 93x - 45}{8x^2 - 10x - 25}$$

A. Vertical Asymptote of $x = 1.0$ and hole at $x = 2.5$

B. Vertical Asymptote of $x = -1.25$ and hole at $x = 2.5$

C. Holes at $x = -1.25$ and $x = 2.5$ with no vertical asymptotes.

D. Vertical Asymptotes of $x = -1.25$ and $x = 2.5$ with no holes.

E. Vertical Asymptotes of $x = -1.25$ and $x = 0.75$ with a hole at $x = 2.5$

3. Which of the following functions *could* be the graph below?
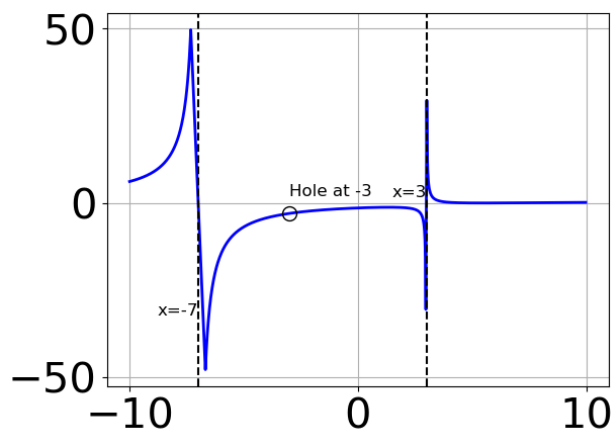
A. $f(x) = \dfrac{x^3 + 8.0x^2 - 3.0x - 90.0}{x^3 - 7.0x^2 - 9.0x + 63.0}$

B. $f(x) = \dfrac{x^3 - 8.0x^2 - 3.0x + 90.0}{x^3 + 7.0x^2 - 9.0x - 63.0}$

C. $f(x) = \dfrac{x^3 + 13.0x^2 + 52.0x + 60.0}{x^3 - 7.0x^2 - 9.0x + 63.0}$

D. $f(x) = \dfrac{x^3 - 10.0x^2 + 19.0x + 30.0}{x^3 + 7.0x^2 - 9.0x - 63.0}$

E. None of the above are possible equations for the graph.

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4. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 - 65x^2 + 74x - 24}{3x^2 - 11x + 6}$$

A. Oblique Asymptote of $y = 4x - 7$.

B. Horizontal Asymptote of $y = 4.0$ and Oblique Asymptote of $y = 4x - 7$

C. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 4x - 7$

D. Horizontal Asymptote of $y = 4.0$

E. Horizontal Asymptote at $y = 3.0$

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5. Which of the following functions *could* be the graph below?
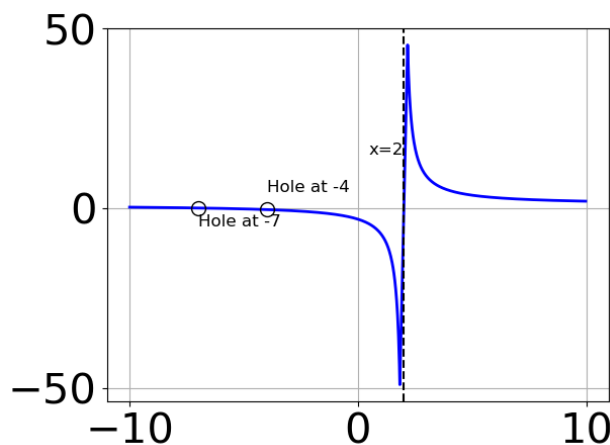
A. $f(x) = \dfrac{x^3 + 14.0x^2 + 63.0x + 90.0}{x^3 + 9.0x^2 + 6.0x - 56.0}$

B. $f(x) = \dfrac{x^3 + 17.0x^2 + 94.0x + 168.0}{x^3 + 9.0x^2 + 6.0x - 56.0}$

C. $f(x) = \dfrac{x^3 - 17.0x^2 + 94.0x - 168.0}{x^3 - 9.0x^2 + 6.0x + 56.0}$

D. $f(x) = \dfrac{x^3 - 7.0x^2 - 24.0x + 180.0}{x^3 - 9.0x^2 + 6.0x + 56.0}$

E. None of the above are possible equations for the graph.

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6. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 - 18x^2 - 11x + 30}{16x^2 + 32x + 15}$$

A. Vertical Asymptotes of $x = -0.75$ and $x = 1.5$ with a hole at $x = -1.25$

B. Vertical Asymptote of $x = -0.75$ and hole at $x = -1.25$

C. Vertical Asymptote of $x = 0.5$ and hole at $x = -1.25$

D. Vertical Asymptotes of $x = -0.75$ and $x = -1.25$ with no holes.

E. Holes at $x = -0.75$ and $x = -1.25$ with no vertical asymptotes.

7. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{9x^3 - 18x^2 - 64x - 32}{3x^2 + 19x + 20}$$

A. Horizontal Asymptote of $y = -5.0$ and Oblique Asymptote of $y = 3x - 25$

B. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 3x - 25$

C. Horizontal Asymptote at $y = -5.0$

D. Horizontal Asymptote of $y = 3.0$

E. Oblique Asymptote of $y = 3x - 25$.

8. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{15x^3 + 26x^2 - 51x + 18}{-15x^3 + 8x^2 + 3x + 18}$$

A. Vertical Asymptote of $y = -0.667$

B. None of the above

C. Horizontal Asymptote of $y = 0$

D. Vertical Asymptote of $y = -3$

E. Horizontal Asymptote of $y = -1.000$

9. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{9x^3 - 24x^2 + 4x + 16}{12x^2 + 23x + 10}$$

A. Holes at $x = -1.25$ and $x = -0.667$ with no vertical asymptotes.

B. Vertical Asymptotes of $x = -1.25$ and $x = -0.667$ with no holes.

C. Vertical Asymptotes of $x = -1.25$ and $x = 1.333$ with a hole at $x = -0.667$

D. Vertical Asymptote of $x = 0.75$ and hole at $x = -0.667$

E. Vertical Asymptote of $x = -1.25$ and hole at $x = -0.667$

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10. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{9x^3 - 18x^2 - 7x + 20}{6x^2 + 7x - 20}$$

A. Vertical Asymptotes of $x = -2.5$ and $x = 1.667$ with a hole at $x = 1.333$

B. Vertical Asymptote of $x = 1.5$ and hole at $x = 1.333$

C. Vertical Asymptotes of $x = -2.5$ and $x = 1.333$ with no holes.

D. Vertical Asymptote of $x = -2.5$ and hole at $x = 1.333$

E. Holes at $x = -2.5$ and $x = 1.333$ with no vertical asymptotes.

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11. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{9x^3 + 36x^2 + 44x + 16}{3x^3 + 20x^2 + 48x + 32}$$

A. Horizontal Asymptote of $y = 3.000$

B. Horizontal Asymptote of $y = 0$

C. Vertical Asymptote of $y = -2$

D. None of the above

E. Vertical Asymptote of $y = -4.000$

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12. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{16x^3 - 16x^2 - 25x + 25}{12x^2 + x - 20}$$

A. Holes at $x = -1.333$ and $x = 1.25$ with no vertical asymptotes.

B. Vertical Asymptote of $x = -1.333$ and hole at $x = 1.25$

C. Vertical Asymptote of $x = 1.333$ and hole at $x = 1.25$

D. Vertical Asymptotes of $x = -1.333$ and $x = -1.25$ with a hole at $x = 1.25$

E. Vertical Asymptotes of $x = -1.333$ and $x = 1.25$ with no holes.

13. Which of the following functions *could* be the graph below?
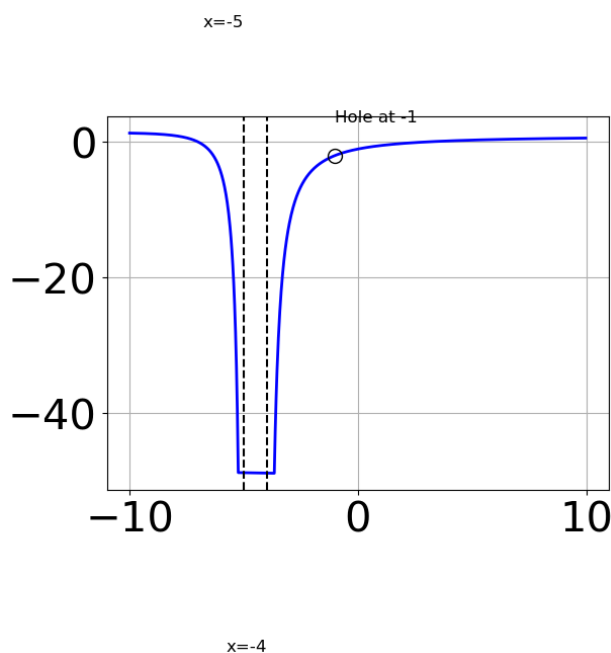
A. $f(x) = \dfrac{x^3 + 5.0x^2 - 17.0x - 21.0}{x^3 + 10.0x^2 + 29.0x + 20.0}$

B. $f(x) = \dfrac{x^3 - 5.0x^2 - 17.0x + 21.0}{x^3 - 10.0x^2 + 29.0x - 20.0}$

C. $f(x) = \dfrac{x^3 - 3.0x^2 - 25.0x - 21.0}{x^3 - 10.0x^2 + 29.0x - 20.0}$

D. $f(x) = \dfrac{x^3 + 3.0x^2 - 25.0x + 21.0}{x^3 + 10.0x^2 + 29.0x + 20.0}$

E. None of the above are possible equations for the graph.

14. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{4x^3 + 12x^2 - 25x - 75}{2x^2 + 13x + 20}$$

A. Horizontal Asymptote of $y = 2.0$

B. Horizontal Asymptote at $y = -4.0$

C. Horizontal Asymptote of $y = -4.0$ and Oblique Asymptote of $y = 2x - 7$

D. Horizontal Asymptote of $y = 2.0$ and Oblique Asymptote of $y = 2x - 7$

E. Oblique Asymptote of $y = 2x - 7$.

15. Which of the following functions *could* be the graph below?
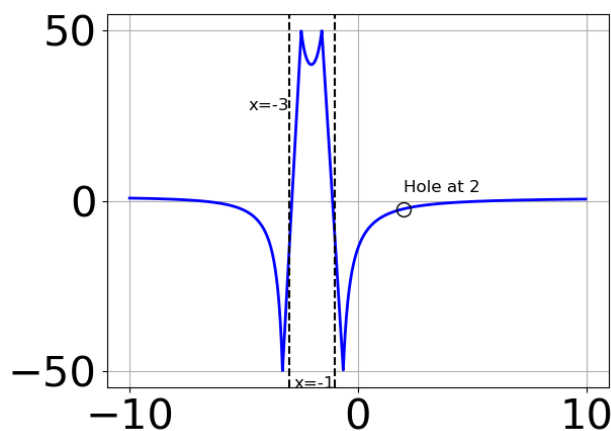
A. $f(x) = \dfrac{x^3 - 3.0x^2 - 40.0x + 84.0}{x^3 - 2.0x^2 - 5.0x + 6.0}$

B. $f(x) = \dfrac{x^3 - 1.0x^2 - 44.0x + 84.0}{x^3 + 2.0x^2 - 5.0x - 6.0}$

C. $f(x) = \dfrac{x^3 + x^2 - 44.0x - 84.0}{x^3 - 2.0x^2 - 5.0x + 6.0}$

D. $f(x) = \dfrac{x^3 - 2.0x^2 - 45.0x + 126.0}{x^3 + 2.0x^2 - 5.0x - 6.0}$

    E. None of the above are possible equations for the graph.

16. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{4x^3 - 28x^2 + 63x - 45}{6x^2 - 19x + 10}$$

    A. Holes at $x = 0.667$ and $x = 2.5$ with no vertical asymptotes.

    B. Vertical Asymptotes of $x = 0.667$ and $x = 2.5$ with no holes.

    C. Vertical Asymptote of $x = 0.667$ and hole at $x = 2.5$

    D. Vertical Asymptotes of $x = 0.667$ and $x = 1.5$ with a hole at $x = 2.5$

    E. Vertical Asymptote of $x = 0.667$ and hole at $x = 2.5$

17. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{12x^3 + 7x^2 - 30x - 25}{3x^2 + 10x - 25}$$

    A. Horizontal Asymptote of $y = 4.0$

    B. Oblique Asymptote of $y = 4x - 11$.

    C. Horizontal Asymptote at $y = -5.0$

    D. Horizontal Asymptote of $y = -5.0$ and Oblique Asymptote of $y = 4x - 11$

    E. Horizontal Asymptote of $y = 4.0$ and Oblique Asymptote of $y = 4x - 11$

18. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{5x^2 + 29x + 20}{15x^3 + 62x^2 - 32}$$

    A. Oblique Asymptote of $y = 3x - 5$.

B. Horizontal Asymptote at $y = -5.000$

C. Horizontal Asymptote of $y = 0.333$ and Oblique Asymptote of $y = 3x - 5$

D. Horizontal Asymptote of $y = 0.333$

E. Horizontal Asymptote of $y = 0$

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19. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{8x^3 - 2x^2 - 63x + 45}{6x^2 - 19x + 10}$$

A. Vertical Asymptotes of $x = 0.667$ and $x = 0.75$ with a hole at $x = 2.5$

B. Vertical Asymptote of $x = 1.333$ and hole at $x = 2.5$

C. Holes at $x = 0.667$ and $x = 2.5$ with no vertical asymptotes.

D. Vertical Asymptotes of $x = 0.667$ and $x = 2.5$ with no holes.

E. Vertical Asymptote of $x = 0.667$ and hole at $x = 2.5$

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20. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{6x^3 - 49x^2 + 125x - 100}{8x^2 - 26x + 15}$$

A. Vertical Asymptotes of $x = 0.75$ and $x = 1.667$ with a hole at $x = 2.5$

B. Vertical Asymptotes of $x = 0.75$ and $x = 2.5$ with no holes.

C. Vertical Asymptote of $x = 0.75$ and hole at $x = 2.5$

D. Vertical Asymptote of $x = 0.75$ and hole at $x = 2.5$

E. Holes at $x = 0.75$ and $x = 2.5$ with no vertical asymptotes.

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21. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{4x^2 - 25x + 25}{12x^3 - 7x^2 - 42x + 40}$$

A. Horizontal Asymptote of $y = 0.333$ and Oblique Asymptote of $y = 3x + 17$

B. Oblique Asymptote of $y = 3x + 17$.

C. Horizontal Asymptote at $y = 5.000$

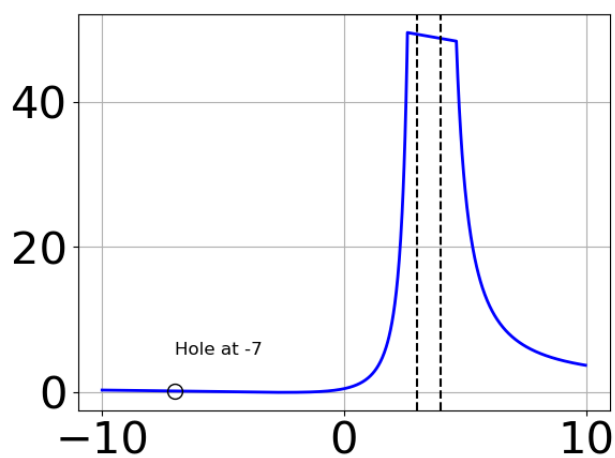D. Horizontal Asymptote of $y = 0$

E. Horizontal Asymptote of $y = 0.333$

22. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 + 2x^2 - 51x + 45}{12x^2 + x - 20}$$

A. Vertical Asymptote of $x = 0.667$ and hole at $x = 1.25$

B. Vertical Asymptote of $x = -1.333$ and hole at $x = 1.25$

C. Vertical Asymptotes of $x = -1.333$ and $x = 1.5$ with a hole at $x = 1.25$

D. Vertical Asymptotes of $x = -1.333$ and $x = 1.25$ with no holes.

E. Holes at $x = -1.333$ and $x = 1.25$ with no vertical asymptotes.

23. Which of the following functions *could* be the graph below?

x=4

Hole at -7

x=3

A. $f(x) = \dfrac{x^3 - 11.0x^2 + 36.0x - 36.0}{x^3 - 37.0x - 84.0}$

B. $f(x) = \dfrac{x^3 - 12.0x^2 + 41.0x - 42.0}{x^3 - 37.0x - 84.0}$

C. $f(x) = \dfrac{x^3 + 12.0x^2 + 41.0x + 42.0}{x^3 - 37.0x + 84.0}$

D. $f(x) = \dfrac{x^3 - 19.0x - 30.0}{x^3 - 37.0x + 84.0}$

E. None of the above are possible equations for the graph.

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24. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{9x^3 + 33x^2 - 32x - 80}{3x^2 + 10x - 25}$$
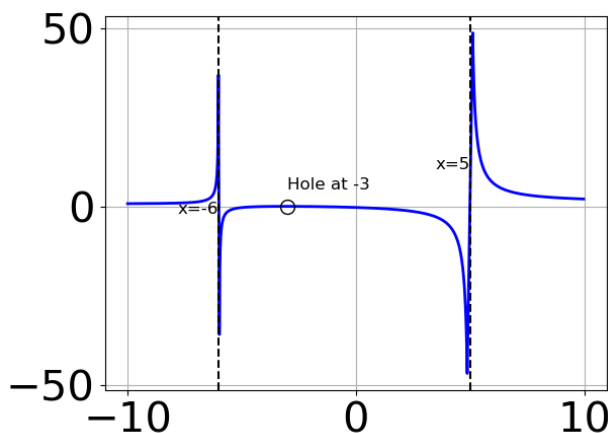
A. Horizontal Asymptote at $y = -5.0$

B. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 3x + 1$

C. Horizontal Asymptote of $y = 3.0$

D. Oblique Asymptote of $y = 3x + 1$.

E. Horizontal Asymptote of $y = -5.0$ and Oblique Asymptote of $y = 3x + 1$

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25. Which of the following functions *could* be the graph below?

A. $f(x) = \dfrac{x^3 - 9.0x^2 + 26.0x - 24.0}{x^3 - 4.0x^2 - 27.0x + 90.0}$

B. $f(x) = \dfrac{x^3 + 5.0x^2 + 2.0x - 8.0}{x^3 + 4.0x^2 - 27.0x - 90.0}$

C. $f(x) = \dfrac{x^3 + 9.0x^2 + 26.0x + 24.0}{x^3 + 4.0x^2 - 27.0x - 90.0}$

D. $f(x) = \dfrac{x^3 + x^2 - 34.0x + 56.0}{x^3 - 4.0x^2 - 27.0x + 90.0}$

E. None of the above are possible equations for the graph.

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26. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{6x^3 - 23x^2 + 29x - 12}{12x^2 - 7x - 12}$$

A. Vertical Asymptote of $x = 0.5$ and hole at $x = 1.333$

B. Vertical Asymptotes of $x = -0.75$ and $x = 1.333$ with no holes.

C. Holes at $x = -0.75$ and $x = 1.333$ with no vertical asymptotes.

D. Vertical Asymptotes of $x = -0.75$ and $x = 1.5$ with a hole at $x = 1.333$

E. Vertical Asymptote of $x = -0.75$ and hole at $x = 1.333$

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27. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{6x^3 + 5x^2 - 49x - 60}{3x^2 - 5x - 12}$$

A. Oblique Asymptote of $y = 2x + 5$.

B. Horizontal Asymptote at $y = 3.0$

C. Horizontal Asymptote of $y = 2.0$ and Oblique Asymptote of $y = 2x + 5$

D. Horizontal Asymptote of $y = 2.0$

E. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 2x + 5$

28. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{5x^2 + 7x - 6}{15x^3 + 16x^2 - 5x - 6}$$

A. Horizontal Asymptote at $y = -2.000$

B. Horizontal Asymptote of $y = 0.333$

C. Horizontal Asymptote of $y = 0.333$ and Oblique Asymptote of $y = 3x - 1$

D. Horizontal Asymptote of $y = 0$

E. Oblique Asymptote of $y = 3x - 1$.

29. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 + 25x^2 + x - 60}{6x^2 + 11x - 10}$$

A. Vertical Asymptotes of $x = 0.667$ and $x = -2.5$ with no holes.

B. Vertical Asymptote of $x = 1.0$ and hole at $x = -2.5$

C. Holes at $x = 0.667$ and $x = -2.5$ with no vertical asymptotes.

D. Vertical Asymptotes of $x = 0.667$ and $x = 1.333$ with a hole at $x = -2.5$

E. Vertical Asymptote of $x = 0.667$ and hole at $x = -2.5$

30. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 - 22x^2 + 3x + 18}{6x^2 + x - 15}$$

A. Vertical Asymptotes of $x = -1.667$ and $x = -0.75$ with a hole at $x = 1.5$

B. Vertical Asymptotes of $x = -1.667$ and $x = 1.5$ with no holes.

C. Vertical Asymptote of $x = -1.667$ and hole at $x = 1.5$

D. Holes at $x = -1.667$ and $x = 1.5$ with no vertical asymptotes.

E. Vertical Asymptote of $x = 1.333$ and hole at $x = 1.5$